

## MINERAL AND ORGANIC FERTILIZERS IMPACT' ON THE GROWTH OF *OCIMUM GRATISSIMUM* L. PRODUCED IN ABOMEY-CALAVI IN SOUTHERN BENIN

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### ABSTRACT

Market gardening is practiced in all regions of Benin and is made up of traditional crops including *Ocimum gratissimum* L., and on the other hand leafy vegetables and other exotic crops. This study conducted in the municipality of Abomey-Calavi aims to evaluate different doses of fertilizers for the sustainable production of this traditional vegetable which, due to its characteristics, is appreciated by the populations. Following a field survey, an experiment was conducted in a completely randomized Fisher device in two repetitions on two varieties of *Ocimum gratissimum*. Four treatments were applied through the use of organics fertilizer (compost Or, Super Gro, neem meal AgroBio) and NPK 20-20-20 foliar fertilizer as mineral. Five variables such as leaf length, stem length, leaf diameter, stem diameter and number of leaves were measured. The analysis of the different variables allow to observe that the compost Or at a dose of 20 T/ha has a significant effect on the length of the stem and the number of leaves. On the other hand, with the treatment made up of super Gro at a rate of 9 g for 16 L of water, the plants developed more than with the gold compost (18.5g) + meal (45.2g) and NPK treatments in a dilution 9 g for 05 L of water ; but less developed than plants treated with Compost Gold. Control plants that received no treatment showed the smallest measurements of leaf length, leaf diameter, stem diameter, stem length and number of leaves; compared to other treatments.

**KEYWORDS:** Growth, Fertilizer, *Ocimum Gratissimum* L., Treatment, Vegetable

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### INTRODUCTION

Vegetable production is developing on the borders of large African cities and contributes to populations' food security (Ahouangninou *et al.*, 2015). Vegetable crops are made up on the one hand of traditional crops (*Ocimum gratissimum* L., *Solanum marcarpon* L., *Amaranthus viridis*) and other leafy vegetables and exotic crops (*Daucus carota* L., *Lactuca sativa*, *Cucumis sativus*, *Phaseolus vulgaris* ...) practiced in urban and peri-urban areas (Ahouangninou *et al.*, 2015).

Commercial stake may explain the fact that market gardeners practice intensive crop protection to control pests and increase the productivity of their farms. Indeed, the south of Benin is heavily watered all year round because it benefits from a favorable subequatorial climate (Boko, 1988; Totin, 2010). Because of its domestic production, Benin continues to import a large part of its consumption of market garden products from neighboring countries such as Burkina Faso and Nigeria (PSRSA, 2009). Vegetable production is an important branch of urban and peri-urban agriculture recognized for its impact on the environment. Indeed, the activity generates significant environmental nuisances, in particular problems related to agricultural irrigation, the reduction of biodiversity and human health due to the use of chemical pesticides (Cissé et al., 2003; Traoré *et al.* , 2006; Pazou *et al.* , 2006; Assogba-Komlan *et Anihouvi* , 2007). Producers sometimes use chemical pesticides with a high risk on beneficial insects and soil biodiversity. Pesticides intended for the cotton sector are often diverted to market gardening (Ahouangninou *et al.* , 2011).

In the use of chemical fertilizers to improve nutrient availability and increase yield at harvest (Cui et al., 2021; Zhang et Zhang, 2007), the recommended doses are still not respected by some producers (FAO, 2021).

Chemical fertilizers have acute and chronic health effects. It is estimated that they are the cause of almost 385 million annual cases of non-fatal accidental poisoning, to which are added approximately 11,000 deaths (UN, 2022). According to the World Health Organization (WHO), there are one million serious pesticide poisonings worldwide each year, causing approximately 220,000 deaths per year (Cherin *et al.*, 2012; Ouammi *et al.*, 2009). Several works (Agbohessi *et al.*, 2012; Ahouangninou *et al.* , 2011; Françoise *et al.*, 2007) focused on the analysis of the active ingredients of pesticides used in market gardening. These data show that market gardeners are at risk from pesticides in intra-urban (Cotonou) and peri-urban (Seme-kpodji) areas in southern Benin (Agnandji, *et al.*, 2018).

Moreover, despite their beneficial effect, chemical fertilizers can also reduce or affect the effectiveness of certain vegetables such as *Ocimum gratissimum* L. has been the subject of several studies (Mensah *et al.*, 2019).

The objective of this study is to evaluate the effect of chemical and organic growth fertilizers on *Ocimum gratissimum*' morphological characters.

## **MATERIAL AND METHODS**

### **Presentation of the Study Environment**

The study was conducted in southern Benin, more specifically in the town of Abomey-Calavi. This commune is located in the department of the Atlantic and between the parallels 6°22' and 6°30' of latitude North and the meridians 2°15' and 2°22' of longitude East. It is limited to the north by the municipality of Ze, to the south by the Atlantic Ocean, to the east by the municipalities of Cotonou and So-Ava and to the west by the municipalities of Ouidah and Tori-Bossito. It covers an area of 539 km<sup>2</sup> and has a population estimated at 656,358 inhabitants in 2013 with 332,784 (50.70%) women and 323,574 (49.30%) men. The commune has nine (9) districts: Abomey- Calavi ; Akassato ; Godomey ; Golo- Djigbe ; Hevié ; Kpanroun ; Ouedo ; Togba and Zinvie and One hundred and forty-nine (149) villages and city districts. (RGPH 4, 2013).

## **METHODS**

### **Investigation Phase**

A structured survey was carried out on a random sample of 50 market gardeners in the municipality of Abomey-Calavi. Survey data was collected by digitizing the form in the Kobocollect digital application . A survey sheet was produced and

sent to the various market gardeners included in the study. Individual interviews and focus groups were therefore carried out. The main data collected during the survey were, among other things, the characteristics of market gardening, the types of growth fertilizers used for the production of *Ocimum gratissimum L.*, and how to use these growth fertilizers.

### **Trial Evaluation**

A nursery was set up in plastic tubs for three weeks. Young healthy and vigorous seedlings were transplanted in a completely randomized block device in two (02) repetitions in plastic pots. Each repetition consists of five treatments distributed in five sub-blocks. Thus, each treatment consisted of 5 pots and two varieties were evaluated. The amount of water and the normal doses of fertilizers were measured. Five different doses of fertilizer distributed between the sub-blocks were thus applied. Thus, the control sub-blocks received any fertilizer application (Dose 0). Combination of “neem” at a rate of 4 tonnes/ha and “compost Or” at a dose of 20 tonnes/ha, i.e. 400g/m<sup>2</sup> and 2000g/m<sup>2</sup> respectively, constituted dose 1. The second dose evaluated was a simple application of “compost Or” at a dose of 20 tonnes/ha. The spraying of the plants with foliar NPK (20-20-20) in a dilution of 9g for 05 L of water represented the third dose then a spraying of a diluted solution of “Super Gro” at a rate of 9g for 16 L of water was the fourth dose assessed.

Doses 1 and 2 were applied to the specific treatments once during the experiment, doses 3 and 4, on the other hand, were applied according to the recommendations on the packaging, ie weekly spraying.

### **Data Collection, Processing and Analysis**

Five quantitative variables were collected 45 days after subculturing. These are leaf length (LL), stem length (SL), stem diameter (SD), leaf diameter (LD) and number of leaves per plant (NLP).

ALL data were processed using Excel 2016 spreadsheet and consisted of percentages determination, graphs and diagrams construction. With regard to the experimental data, in addition to these last analyses, the Statistica version 6 software was used to describe the variables collected and to study the variability existing between these variables through significance tests. R 4.2.1 software was used to analyze the correlation between the variables, in aim to distribute them on the axes of the principal component. This analysis made it possible to analyze the contribution of fertilizers in the growth of *Ocimum gratissimum* plants.

## **RESULTS**

### **Characterization of Production of the Different Market Gardening Sites**

Producers surveyed belong to different agricultural structures such as cooperatives (34.48%), groups (3.45%) and establishments (62.07%). Of all its structures, a 65.52% is formal against 34.48% who work informally. On the market garden farms of the municipality of Abomey- Calavi different species of vegetables are produced and vary from one district to another. Despite the few specificities observed, it should be noted that the *Ocimum species gratissimum* and *Amaranthus spp*, represent the main crops in the study area. In addition to these cultures, the species *Vernonia amygdalina* (Abomey- Calavi, godomey, Kpanroun, Togba), *Solanum macrocarpon* (Manlahouin, Ouèdo, Togba, Zinvie), *Daucus carota* and *Lactuca sativa* (Godomey) (Table 1).

**Table 1: Main Productions Of Market Gardening Sites**

Commune	Main crops
Abomey Calavi	<i>Ocimum gratissimum</i> , <i>Vernonia amygdalina</i> , <i>Amaranthus spp</i>
Akassato	<i>Ocimum gratissimum</i> , <i>Amaranthus spp</i>
Godomey	<i>Ocimum gratissimum</i> , <i>Vernonia amygdalina</i> , <i>Amaranthus spp</i> , <i>Daucus carota</i> , <i>Lactuca sativa</i>
Kpanroun	<i>Ocimum gratissimum</i> , <i>Vernonia amygdalina</i> , <i>Amaranthus spp</i> , <i>Solanum macrocarpon</i>
Ouedo	<i>Ocimum gratissimum</i> , <i>Amaranthus spp</i> , <i>Solanum macrocarpon</i>
Togba	<i>Ocimum gratissimum</i> , <i>Vernonia amygdalina</i> , <i>Amaranthus spp</i> , <i>Solanum macrocarpon</i>
Zinvie	<i>Ocimum gratissimum</i> , <i>Amaranthus spp</i> , <i>Solanum macrocarpon</i>

*Ocimum gratissimum*'s value chain in the commune of Abomey-Calavi is characterized by different activities such as production, commercialization and distribution and processing (Table 2). However, it should be noted that the main activities of all the sites are production and commercialization. Apart from the sites of Godomey and Ouèdo where distribution represents a secondary objective to production, the other market gardening sites do not position themselves on distribution. Even if training is not a main objective of the farms, we find that these producers invest very little in training and represent only 26% of the surveyed population.

**Table 2: Production Targets of Farmers**

Arrondissement	Number site	Prod_com	Distribution	Training
Abomey- Calavi	3	3	0	2
Akassato	3	3	0	2
Godomey	7	7	2	2
Kpanroun	2	2	0	0
Ouedo	9	9	3	2
Togba	10	10	0	2
Zinvie	16	16	0	3
<b>Total</b>	<b>50</b>	<b>50</b>	<b>0</b>	<b>13</b>

Prod: production

### Diversity of Fertilizers used in Market Gardening Areas of Southern BENIN

Looking for best production requires producers to use various chemical products or not. Thus, the use of fertilizers (organic and mineral) depends on the results expected by the producers. A rate of 7% of producers uses only organic fertilizers against only 3% who only use mineral fertilizers. Most of producers (76%) combine mineral and organic fertilizers in order to help plant to give the maximum of production. However, in some regions such as Zinvie, producers don't apply any fertilizer during their production and were 14% of the surveyed producers. Different types of fertilizers' characterization revealed that all surveyed producers using mineral fertilizer apply Urea and NPK (Nitrogen – Phosphorus – Potassium). A diversification is essentially observed at the level of organic fertilizers use'. This is mainly the application by 45.45% producers of poultry manure, "compost Or" by 22.73% and "Super Gro" by 18.18%. The smallest proportions dedicate themselves to the use of cow manure (4.55%), plant extracts (4.55%) such as fertilizer based on fruit juice, the aqueous extract of the plant *Urtica dioica* and the use of poultry manure in combination with wood chips (4.55%).

### Agrosystem of *Ocimum Gratissimum*

According to the producers, the use of a category of fertilizer is linked to the desired role in obtaining fertilizer. Thus, different roles are known for organic fertilizers. According to 50% of respondents, these fertilizers ensure the growth of the plant against 20% who think that they only contribute to the availability of nutrients to the plant and 10% reported the development of the plant. Acceleration of plant growth thanks to the action of poultry manure is also reported by 10% of respondents, while the decrease of the color intensity of the plant by the use of compost and the preservation of humidity of the soil due to Super Gro are respectively cognizant by the lowest proportion of producers (5%). It is also important to specify that certain fertilizers such as poultry manure and compost assist floral initiation according to 10% of respondents. Although they ensure the growth of plants in production, mineral fertilizers unlike organic ones also have consequences on the agrosystem of vegetables. Among others, these are the impoverishment of the soil (33.36%), the alteration of the organoleptic properties of vegetables (27.77%), the modification of the quality of the soil (26.33%) and negative effects on animal health and biodiversity (12.54%). The application rates vary from one fertilizer to another and according to their form. The quantities given by the producers are summarized in Table 3.

**Table 3: Application rate of fertilizers**

Kind	Fertilizer	Dose	Unit
Mineral	Urea	40	g/l
	NPK	40	g/l
Organic	Poultry manure	0.50 - 1.70	Kg/m <sup>2</sup>
	Compost	0.6	Kg/m <sup>2</sup>
	Super Big	0.31	ml/l
	cow dung	2.1	Kg/m <sup>2</sup>
	Plant extract	15.6	ml/l
	Poultry manure + chip	0.6	Kg/m <sup>2</sup>

g : gram; l: Liter; Kg: kilogram; m<sup>2</sup>: square meter; ml: millimeter;

### Effect of Treatment on the Characters' Variability

The analysis of the distribution of the variables let to note on the whole of the treatments carried out a large distribution around the average with coefficients of variation ranging from 28.95% (LL) to 62.73% (NLP). The average values recorded over all the treatments were  $14.26 \pm 4.13$  cm for the length of the leaves (LL);  $8.56 \pm 2.69$  cm for leaf diameter (LD);  $0.41 \pm 0.16$  cm for stem diameter (SD);  $29.47 \pm 15.47$  cm for the length of stems (LS) and  $18.65 \pm 11.70$  for the number of leaves (NLP) (Table 4). The two-ways variance analysis indicates that there is a highly significant difference at different threshold level between the doses of the different fertilizers applied on the one hand and between the fertilizer x variety interaction specifying that the variations observed at the level of the varieties are due to the applied fertilizers. Moreover, for this same level of evaluation, the significant difference between the varieties are only obtained with stem length ( $p < 0.05$ ) and number of leaves per plant ( $p < 0.001$ ) (Table 5). Combined analysis of the treatments' effect on the both varieties submitted for evaluation shows that the maximum values are obtained for the treatment receiving the "compost Or". Similar average performances were obtained with bulk of compost Or and palm meal and foliar NPK treatments. Finally, lowest performance was recorded with the Super Gro (Figure 1).

**Table 4: Descriptive Statistics of the Measured Variables**

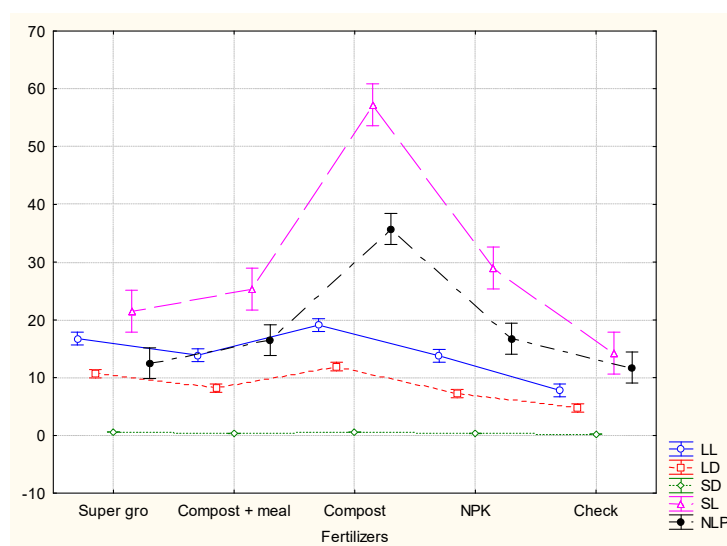
Features	Average	Minimum	Maximum	SD	CV (%)
LL	14.26	7.06	21.36	4.13	28.95
LD	8.56	4.36	12.76	2.69	31.42
SD	0.41	0.22	0.73	0.16	37.80
SL	29.47	12.00	62.00	15.47	52.50
NLP	18.65	11.00	56.00	11.70	62.73

LL : leaf length; LD : leaf diameter; SD : Stem diameter; SL : Stem length; NLP : number of leaves per plant; CV: coefficient of variation; % : percentage

**Table 5: Analysis of Variance of the Different Variables Measured**

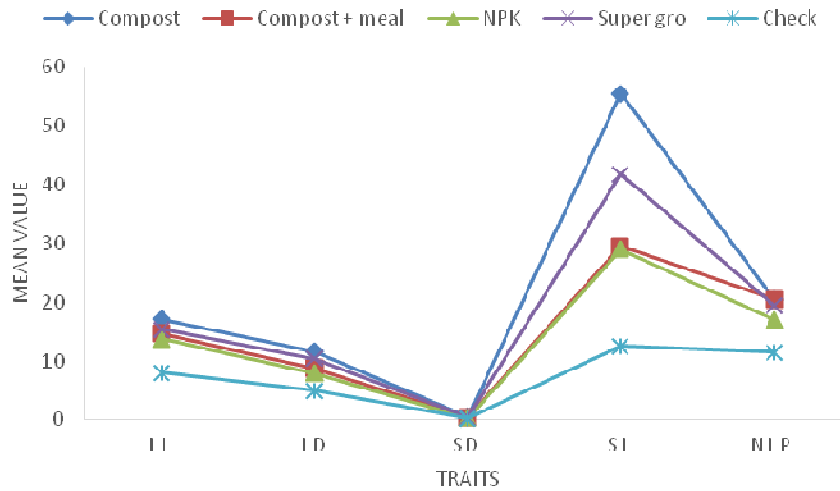
		Variety	Fertilizer	Variety:Fertilizer	Residuals
<b>Df</b>		1	4	4	10
<b>LL</b>	<b>Mean Sq</b>	4.79	71.98	5.31	1.00
	<b>F</b>	4.796	72.031***	5.315*	
<b>LD</b>	<b>Mean Sq</b>	0.38	32.27	0.91	0.43
	<b>F</b>	0.902	75.824***	2.140	
<b>SD</b>	<b>Mean Sq</b>	0.00079	0.09497	0.01913	0.00075
	<b>F</b>	1.063	127.131***	25.603***	
<b>SL</b>	<b>Mean Sq</b>	63.7	1323.2	99.8	12.4
	<b>F</b>	5.146*	106.861***	8.059**	
<b>NLP</b>	<b>Mean Sq</b>	211.2	353.7	220.9	5.8
	<b>F</b>	36.74***	61.51***	38.41***	

LL : leaf length; LD : leaf diameter; SD : Stem diameter; SL : Stem length; NLP : Number of leaves per plant; CV: coefficient of variation; % : percentage ; Sq: Square; F: Fisher value; Significant codes: \*\*\* :  $p < 0.001$  ; \*\* :  $p < 0.01$  ; \* :  $p < 0.05$

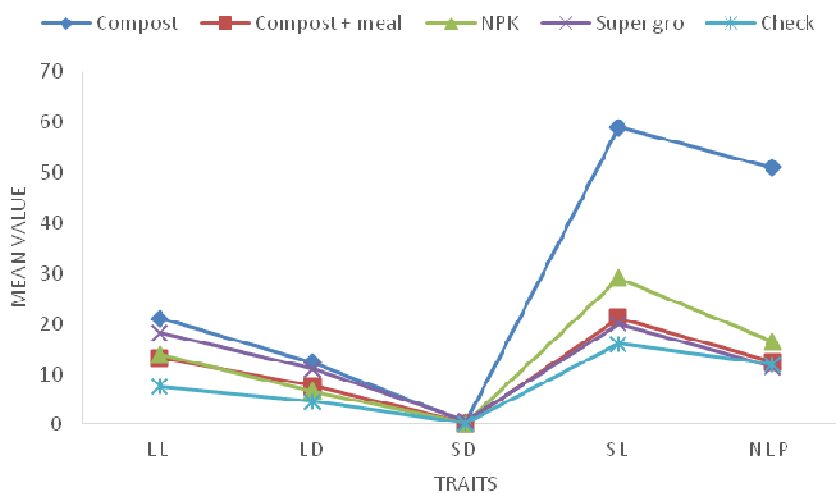
**Figure 1: Combined Effects of Treatments on the Growth of *Ocimum Gratissimum I.***

**Effects of Fertilizers on the Growth of Basil Plants**

Different treatments consisting of the variation between fertilizers doses were applied to the both studied varieties of African basil (*Ocimum gratissimum*). Whatever the nature of the variety, the treatment without fertilizer showed weak growth for the different variables recorded (Figure 2 and 3). In addition, the dose of compost applied allow to get the maximum potential of each of the variables evaluated compared to that of the other fertilizers. In addition, length of the stems indicated, contrary to the other variables, a weak growth when submit to Super Gro compared to the other variables evaluated with the local variety (Figure 2). Graph shows that control plants that received no treatment exhibited the smallest measurements of leaf length, leaf diameter, stem diameter, stem length, and leaf number per plant; compared to other treatments. On the other hand, with Super Gro which is a growth fertilizer, the plants were developed more than those submitted to bulk of compost Or and poultry manure and NPK; but less developed than plants treated with gold compost. More specifically, with the improved variety (Figure 3) a similar trend is obtained at with the different characters except the length of stems. With that trait, the plants subjected to the super Gro presented a similar effect with the plants submitted to the bulk compost and palm meal.



**Figure 1: Effect of Fertilizers on the Performance of the Local Variety of *Ocimum Gratissimum L.***



**Figure 2: Effect of Fertilizers on the Performance of the Improved Variety of *Ocimum Gratissimum I*.**

## DISCUSSION

In southern Benin, leafy vegetables are consumed more and its production is prioritized by several market gardeners. In the commune of Abomey-Calavi, we find in the arrondissements, actors in this sector, who belong to the Communal Union of Market Gardeners of the commune. Most are organized as cooperatives (34.48%), establishments (62.07%), and groups (3.45%). A proportion of 65.52% is in the formal sector against 34.48% who work in the informal sector.

Depending on demand, the main vegetables grown vary from one district to another. In the districts of Abomey-calavi, Zinvie, Ouedo, Akassato, Togba and Ouedo, *Ocimum gratissimum* and *Amaranthus spp* were found. In addition to these cultures, the species *Vernonia amygdalina* (Abomey- Calavi, godomey, Kpanroun , Togba), *Solanum macrocarpon* (Manlahouin , Ouèdo , Togba , Zinvie), *Daucus carota* and *Lactuca sativa* (Godomey).

According to many authors, *Ocimum gratissimum* procures many benefits on health treatment including diarrhea, dysentery, hypertension, candidiasis (Agbankpé *et al.*, 2014), diabetes in pregnant women (Fah *et al.*, 2013), and Buruli ulcer (Yémoa *et al.*, 2008) and its antifungal effect, from *Ocimum gratissimum* L. It is indeed renowned in agro-ecology for its activity against soil pathogens and against insect seeds' pests and seeds. The extract has been tested effective on *Callosobruchus maculatus* (Ketoh *et al.*, 2002), *Aspergillus flavus*, *Aspergillus parasiticus*, *Asperillus ochraceus* and *Fusarium oxysporum* (Adjou *et al.*, 2013), *Sitophilus oryzae* L. and *Tribolium castaneum* (Aïssata, 2009), *Anopheles fatal* ss (Ntonga *et al.*, 2012) and insects (Nguemtchouin, 2012). Its value chain is characterized by different activities such as production, marketing and distribution. Production and marketing are more offered by market gardeners in the study area, because of the influx of women on the sites for purchase. Godomey and Ouedo sites, on the other hand, are in distribution and training (secondary activities). For 26% of producers, training is only their secondary activity, except for market gardeners in the district of Kpanroun.

Basil's production value chain, is marked by the use or not of mineral fertilizers by the producers, in order to ensure better development of the plant, and to obtain a good yield, these fertilizers are used. A rate of 7% of producers use only organic fertilizers against only 3% who only use mineral fertilizers. The majority of respondents, 76%, combine



fertilizers (mineral + organic) in order to get the maximum performance from their production. However, in certain regions of the municipality such as Zinvie, producers do not apply any fertilizer during their production and represent 14% of the surveyed population.

The number of producers surveyed use Urea and NPK as mineral fertilizers. On the other hand, various types of organic fertilizers are used for the production of *Ocimum gratissimum* L. Of the 100% of market gardeners, 45.45% use poultry manure, 22.73% use compost and 18.18% use Super Gro. The smallest proportions devote themselves to the use of cow dung (4.55%), plant extracts (4.55%) such as fertilizer based on fruit juice, the aqueous extract of the plant *Ortica dioica* and the use of poultry manure in association with wood shavings (4.55%).

For 10% of the producers surveyed, poultry manure accelerate plant growth. For other producers (5%), the compost contributes to reducing the color of the plant. A dose of 0.5 to 1.7 kg/m<sup>2</sup> is applied per bed of 6 m<sup>2</sup> by the producers. While the normal recommended dose is 20 t/ha, i.e. 90.4g per area.

The Super Gro, maintaining humidity at ground level, for 5% of people surveyed. In addition to the roles of compost and manure, 10% of producers affirmed after experiment that these fertilizers also facilitate flower initiation. Although they ensure the growth of plants in production, mineral fertilizers unlike organic ones also have consequences on the agrosystem of vegetables. These include, among other things, the impoverishment of the soil (33.36%), the alteration of the organoleptic properties of vegetables (27.77%), the destruction of the quality of the soil (26.33%) and the effects negative on animal health and biodiversity (12.54%). For the observation of these effects, different doses are applied and vary depending on the type of fertilizer. The application of Super Gro by market gardeners is 0.31 ml/L of water for 20 beds of 6 m<sup>2</sup>. According to the manufacturer's instructions, it normally takes 9 g of the product to be diluted in 5L of water.

In the context of this study, the organic and mineral fertilizers used are phytogreen NPK 20-20-20, compost Or from the Africa Compost company, neem AgroBio from the company biophyto hills and the Super Gro.

After 45 days of treatment of the plants with organic and mineral fertilizers, and the various analyzes carried out during the processing of the data, it is noted that the control plants of the varieties have developed less than the plants having received the treatments. The analysis of the distribution of the variables made it possible to note on the whole of the treatments carried out a large distribution around the average with coefficients of variation ranging from 28.95% (LL) to 62.73% (NLP). Fertilizers therefore play a role in the development of leaf length and number of leaves. The analysis of variance indicates that there is a highly significant difference at the 5% threshold between the doses of the different fertilizers applied on the one hand and between the interaction fertilizers x varieties indicating that the variations observed at the level of the varieties are due to the fertilizers applied. Moreover, for this same level of evaluation, the significant difference between the varieties is small. A more specific analysis on the expression of the varieties through the measurement of the different characters shows that only the number of leaves character showed a significant difference at the 5% threshold. The combined analysis of the effect of the treatments on the two varieties submitted for evaluation shows that the largest peaks are obtained for the treatment that received the compost. Similar average performances were obtained with the compost + cake and foliar NPK treatments. Plants treated with compost + neem cake developed less than those treated with compost, on the other hand. This corroborates the work of the SPV/GTZ structures (1996), which proved that neem cakes can lead to growth retardation phenomena, or even plant dieback if it is applied after transplanting. According to these structures, the nematicidal action of the meal on the nematodes and on the fertility of the soil manifests itself only

after a certain time. Given these two reasons, Cisse (2014), claim that neem meal should be applied 10 to 15 days before sowing or transplanting. Which is contrary to the methods of use of producers, who apply it after transplanting.

Finally, the weakest performances were recorded with super Gro. The positive effect of organic fertilizers on plants has already been recorded by several authors (Biaou *et al.*, 2018; ogbonna *et al.*, 2012). Biaou *et al.* (2018) showed that compost enriched with poultry manure significantly contributed to the increase in carrot yield in Benin. As for Ogbonna *et al.* (2012), their study on maize found that organic fertilizer improved the vegetative growth of this crop. These results also prove that in reality, the super Gro, has no effect on the development of the plant. Contrary to what 95% of the producers in the field say and the sales arguments for this product by the suppliers.

The principal component analysis of the different variables confirms that the compost contributes to increasing the length of the stem at the level of the two varieties and the number of leaves at the level of the improved variety.

## CONCLUSION

A healthy and ecological production is possible with the varieties of *Ocimum gratissimum* L. The use of fertilizers in its production, is for the producers, a means to make profitable and to satisfy the consumers. The producers met as part of this study are well aware of the effects of chemical fertilizers on the nutritional and therapeutic values of *Ocimum gratissimum* L. and negative impacts on the soil, the environment and their health. They only use organic fertilizers for commercial production. For their own consumption, organic production is made at their places of residence. The consumption rate of leafy vegetables in southern Benin creates competition between producers who have no choice but to use mineral materials. It should be noted that despite this competition, the market gardening sector is well organized in Benin. The producers of *Ocimum gratissimum* L. of the study area, belong to the Union of Market Gardeners of the municipality of Abomey-Calavi. Constituted in group (3.45%), in cooperative (34.48%), and in establishment (62.07%), are in the formal 65.52% and 34.48% are in the informal. This value chain is characterized by production, marketing, distribution and training. Several organic and mineral fertilizers are marketed by the suppliers of inputs for the development of *Ocimum gratissimum* L., but the most used in the study area are Compost (22.73%), manure (45.45%), cow dung, NPK, foliar fertilizer 20-20-20, the Super Gro (18.18%), the plant extract (4.55%), the aqueous extract of the *Urtica dioica* plant and a combination of poultry manure and shavings (4.55%). The experiments carried out for this work were carried out with Or compost, Super Gro, NPK 20-20-20 foliar fertilizer and the combination of neem cake and compost. It appears from the various analyzes that compost has a significant effect on the development of African basil, compared to foliar fertilizer NPK 20-20-20, the combination of neem cake and compost, and super Gro. Leaf length, stem length, number of leaves, stem diameter and leaf diameter, showed a marked improvement for the compost treatment than the other treatments. Super Gro, which contributes to moisture and increased leafy vegetable production by 300%, had no significant effect on the growth of African basil during the evaluation. Slight development is observed with plants treated with NPK 20-20-20 foliar fertilizer and the combination of neem meal and compost Or. Contrary to the perceptions of super Gro by producers, in the growth of African basil, the results of this study prove that there is no longer any need to use it.

Compost is therefore recommended for a profitable and ecological production of *Ocimum gratissimum* L. A recovery of Gold compost is therefore important for the preservation of the soil, the safeguard of the environment and the safeguard of the biochemical characteristics of *Ocimum gratissimum* L. It is important to raise awareness and train market gardeners on the different normal doses of fertilizer application.

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